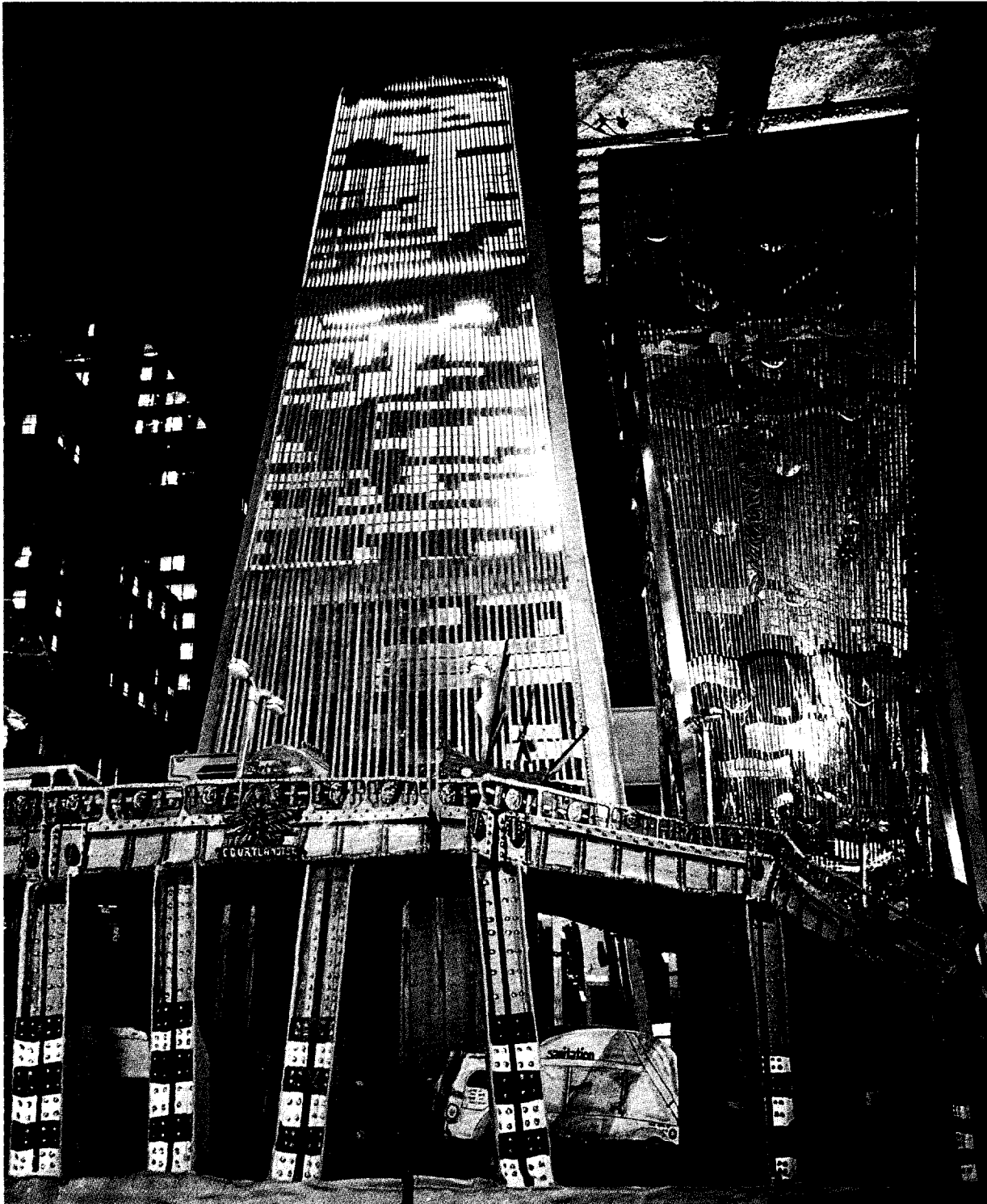


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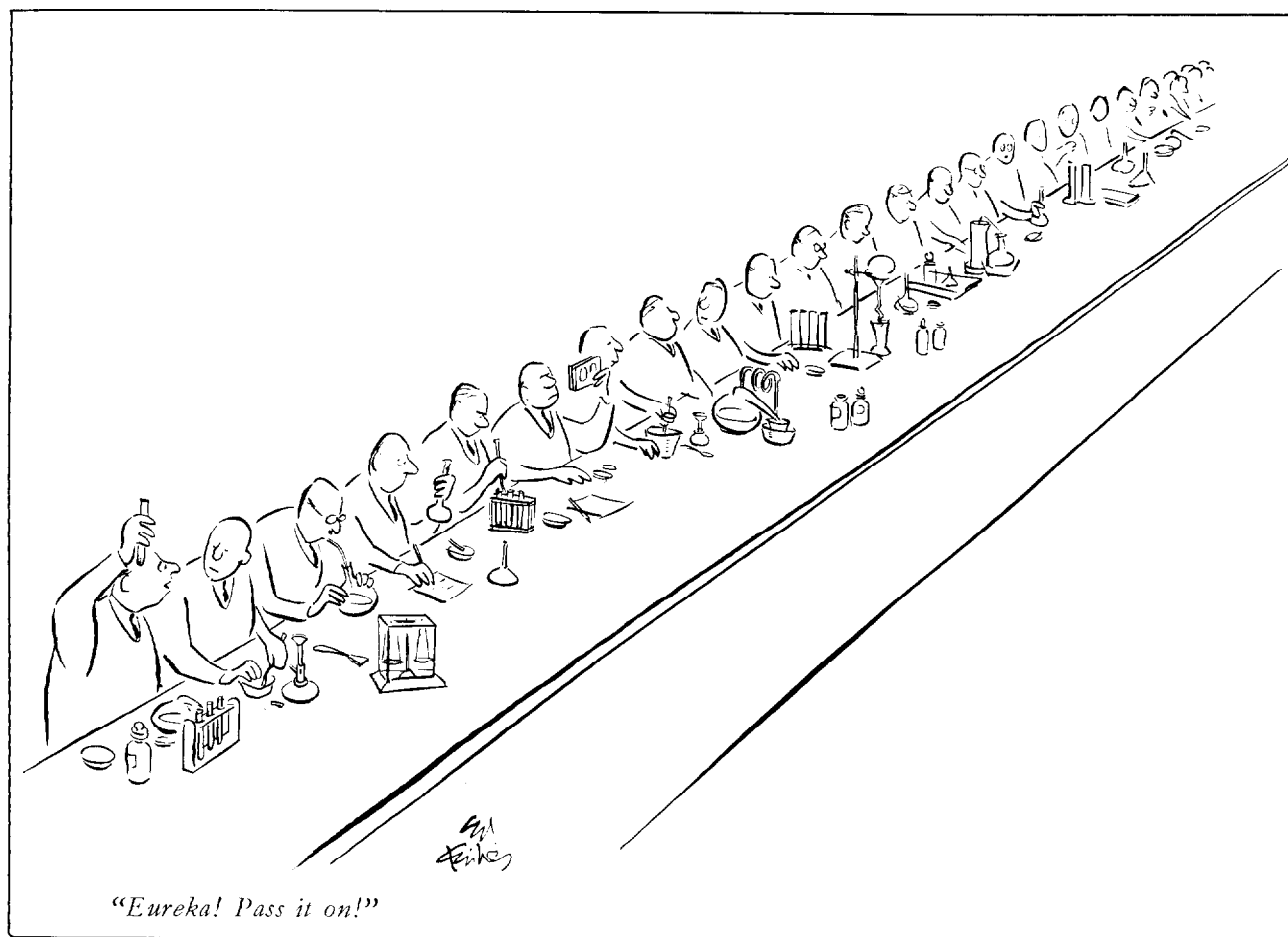
# Network New York

How does the scientific community communicate?

by Joshua Lederberg

When I was a student at Columbia Medical School 35 years ago I was privileged to be able to work in the laboratory of Francis J. Ryan in the Department of Zoology at the Morningside Heights campus of the university. At that time teachers and workers from several other New York City institutions were often in evidence at the Columbia laboratories, and a frequent visitor to the department was the late Alfred Mirsky of The Rockefeller Institute. In his own work, and through his accounts of the work taking place in O.T. Avery's laboratory, we promptly learned of the very exciting developments connected with the identification of DNA as the substance of heredity in bacteria. These reports were to be the primal inspiration of my own investigative career.

A similar axis connected Columbia with the biological laboratory at Cold Spring Harbor, at that time directed by Milislav Demerec. Again, there was a rapid intercommunication, through individual visits and seminars, of the seminal work on bacterial mutation going on at those laboratories. This work was also discussed in the summer courses on bacteriophage that were led by Max Delbrück and S.E. Luria. In 1946, E.L. Tatum and I were afforded the unique opportunity of presenting our first results on genetic recombination in *E. coli* to an assembled international conference at Cold Spring Harbor, which helped to establish an early and thorough critical assessment of our work and prompt global dissemination of the results.



Drawing by Ed Fisher. © 1970 The New Yorker Magazine, Inc.

Today, a similar pattern prevails in New York City on a large scale; there is hardly an institution in the city that does not have one or more of its members on the adjunct faculty of The Rockefeller University in close collaboration—intellectually and, as often as not, at the bench—with one of the regular Rockefeller faculty. Notices of seminars, colloquia and other lectures are freely disseminated among the major institutions in the city, although it would be pressing reality to say that there are always outside visitors at these events. And when prominent scientists from outside the city are visiting, the grapevine is usually aware of it. Rare is the occasion that such people are not invited to extend their visits, usually in the company of colleagues from other institutions here. (I am not aware of any formal surveys on the subject, but it is my impression that casual individual visits to laboratories are more frequent than the attendance of seminars and similar events at other institutions.)

### *Largest Scientific City*

Information, of course, is the very substance of scientific research. The specialized science centers elsewhere are dominated by one or two majestic institutions, and communication among scholars becomes part of the warp and woof of academic traditions and structure within such institutions. Each has its own distinctive characteristics. Outside the United States, and most of all in the Soviet Union, scientific effort tends to be organized much more formally under the direction of government. The federal laboratories clustered around Washington, D.C. follow this model, in contrast to the way that science has developed and been organized in most of our other centers. But more than any other city that comes to mind, the terrain of scientific effort in New York displays a considerable diversity of centers of special interest and talent dispersed among a variety of institutions.

New York City is so well known for its other resources that many people may be surprised to learn that it is also the largest scientific city in the United States. To some readers, the figures in the accompanying table may be startling evidence of the continued vitality of scientific effort in the metropolis; to others they may attest to the westward drift which has been an undeniable feature of university life in this country since World War II. Our purpose here, however, is not to make potentially invidious comparisons of numerical statistics, but rather to try to signal the ways in which the scientific life of New York City may have its own distinctive features in a qualitative way, now and in the future.

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*Joshua Lederberg was educated in New York City—Stuyvesant High School, Columbia College and Medical School. After 32 years as a professor at the University of Wisconsin and then at Stanford University, he returned to New York in 1978 to assume the presidency of The Rockefeller University. In 1958 he shared the Nobel Prize in Physiology or Medicine with George Beadle and Edward Tatum for his work on genetic recombination in bacteria.*

*Cities with the largest numbers of primary authors of scientific papers. (From Inhaber, H., SCIENTIFIC CITIES RESEARCH POLICY, 1974.)*

| City             | Number of primary authors | Population (in thousands) | Primary authors per 1000 population |
|------------------|---------------------------|---------------------------|-------------------------------------|
| Moscow           | 7421                      | 6942                      | 1.07                                |
| London           | 4805                      | 8104                      | 0.59                                |
| New York         | 4173                      | 11528                     | 0.36                                |
| Washington       | 3453                      | 2861                      | 1.21                                |
| Paris            | 3027                      | 9250                      | 0.33                                |
| Tokyo            | 2866                      | 11399                     | 0.25                                |
| Chicago          | 2279                      | 6978                      | 0.33                                |
| Philadelphia     | 2030                      | 4817                      | 0.42                                |
| Leningrad        | 1989                      | 3513                      | 0.57                                |
| Los Angeles      | 1965                      | 7032                      | 0.28                                |
| Boston           | 1962                      | 2753                      | 0.71                                |
| Cambridge, Mass. | 1446                      | 100                       | 14.50                               |
| Berlin           | 1380                      | 3217                      | 0.43                                |
| Berkeley, Cal.   | 1289                      | 117                       | 11.00                               |
| Kiev             | 1282                      | 1632                      | 0.79                                |
| Prague           | 1228                      | 1031                      | 1.19                                |
| Munich           | 1224                      | 1302                      | 0.94                                |

Although pursuing its own ideals, which are set in the universality of scientific disciplines, science in New York has always been, of necessity, also amenable to the cultural life of the city as well as to its enormous and hardly-to-be-evaded social problems. The most evident “factors of production” that give New York its special quality are its long history as a port and commercial center, and its aggregation of material resources and people. The very special needs and aspirations of these people for social mobility have been realizable in large measure through technical and scientific education. For many decades this upward mobility through learning has been a central motif of the system of public education in the city, an ideal that has been put to its severest test by the fiscal and demographic inundations of recent decades.

These productive factors, a number of historical and political accidents, and the centripetal attraction of the general cultural offerings of the city have converged to foment a diverse set of scientific institutions. Along with the universities, the museums, zoological and botanical parks, and hospitals have been fertile affiliates of the teaching institutions. The Rockefeller Institute for Medical Research, founded in 1901, constituted nearly half of the nation's resources devoted to biomedical research for the first quarter of the century. Industrial laboratories with a large commitment to basic scientific effort like those of the Bell Laboratories and IBM, although located in the suburbs, have also added a distinctive flavor to the scientific life of the city.

### *Informal and Formal*

As suggested earlier, the patterns of communication and cooperation among the city's institutions are, for the most part, informal and unorganized. Most contacts depend on the commonality of interest and private arrangements of a few individuals rather than formal inter-insti-

tutional affiliations. There are however a few patterns of formal organization that have also left their stamp on the city. Above all, of course, is The New York Academy of Sciences, which although now very much an international institution draws a significant portion of its attendance at its frequent symposia from among New York City residents. The Academy also holds a number of less formal meetings which are specifically designed for New York City residents and which meet regularly around specific disciplinary themes. The New York Academy of Medicine has, especially in times past, played a comparable role for the medical sciences. Its library remains a unique archival resource and, either through interlibrary loan or through visits from the far-flung boroughs, is one of the treasured repositories of medical scientific activity in this area. Drawing in part on The Academy of Medicine and in part on its own collections, to which many city institutions contribute, the Medical Library Center helps make medical literature readily available throughout the city's institutions. And, of course, the New York Public Library is another centralized collection of importance in some specialities.

For the biomedical sciences, the monthly Harvey Society lecture is a tradition of unique value not only in bringing New York the most exciting of scientific pioneers, but also as an occasion for convivial and friendly reunions among diverse members of the community—both established scientists and an encouraging number of graduate students and fellows from a wide range of institutions and disciplines. Many other societies, more often New York branches of national or global organizations than those which are uniquely confined to New York City, nurture similar events. It is on those occasions that one can most readily assess the wealth of intellectual resources that can be brought together from within the compass of a single city. The breadth of opportunity for intellectual stimulation and the cooperation of specialists thus gives the scientist in New York an unexampled opportunity to work in a loosely organized interdisciplinary framework free of some of the sibling competition that can operate within a single institution.

### *Metropolitan Life*

What about trends for the future? The shift of economic and cultural resources to the West and now the Sun Belt has diversified the geographic opportunities for talented people. Since World War II the US population has been remarkably mobile. (New Yorkers, it is true, have been comparatively sessile, but, even so, the city has doubtless exported much of its intellectual talent in recent years.) This pattern, however, may be reversing itself. General economic strictures, the end of both the wave of “baby-boom” students in higher education and of the rapid growth of academic and science budgets, must dampen geographic and social mobility. In the eyes of many, then, New York City has passed its nadir; it may now be attractive enough to retain its native professional talent

and encourage a new wave of in-migration. The cost and quality of available housing will, of course, loom very high among the considerations affecting such moves. New York recently figured as one of the *least* desirable posts for assignment of executives—a stigma that one hopes may be overcome by other incentives and by dynamic changes in the life of the city itself. Some important social trends may add to preferences for metropolitan life on the part of aspiring scientific talent. The postponement of marriage and children on the part of many younger people and the connected opening up of scientific careers for women may be expected to reduce some of the competitive lure of suburban life. In particular, when both members of a couple are seeking a professional career only a metropolis is likely to offer an opportunity for each to find a satisfactory position.

As to patterns of communication, the increasing congestion in the city, the hazards (mechanical, animal and human) of the streets, and many external pressures for increasing specialization may deter some of the informal interpersonal exchanges previously discussed. Telecommunications are improving all the time and their costs rapidly decreasing (a local phone call is cheaper than a letter!). They offer alternative avenues of discourse to face-to-face conversation, essentially independent of distance and geographic location. The specialties of science are inherently universal and most workers are likely to be better acquainted with their colleagues in foreign countries working in the same area than they are with their neighbors down the street. Lectures on general scientific issues attract laity more than scientific professionals. The grant system of financial support of science, insofar as it is focused on specific projects, and is reviewed by peers within an existing specialty, puts up formidable barriers to interdisciplinary efforts.

For all these reasons we may see an increasing regionalization of effort with patterns of communication tending to embrace clusters of related institutions within easy walking distance. One sees complexes now around New York University, around East 68th Street (Memorial Hospital-Sloan Kettering Institute, New York Hospital, Cornell Medical College, The Rockefeller University) around Columbia University and Medical School in upper Manhattan. (As is well known, a few crosstown blocks are a more formidable obstacle than miles in a north-south direction!) Nevertheless the buses and the subway and the taxis do function most of the time and as long as they do the inherent values of intercommunication are likely to keep science in New York operating as the fertile archipelago that it has been for many decades. Without much formal organization, with a good deal of specialization in each of its “islands,” with voluntary association and discourse among its elements to suit the needs of the individual and of the moment, science in New York City can continue to sustain its extraordinary vitality and to offer opportunities for breadth that are exceeded nowhere in the world. □